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WHAT IS CLAIMED IS:

- 1. A composition of functional additives useful for incorporating in water as a dip for the preservation of cut apple pieces comprising ascorbic acid and calcium ions, wherein the molar ratio between the ascorbic acid and the calcium ions is between about 2.8:1 to about 4.0:1.
- 2. A composition according to claim 1 wherein the molar ratio is between about 2.8:1 to about 3.5:1.
- 3. A composition according to claim 1, wherein the composition further comprises magnesium ions, and the weight ratio between the calcium ions and magnesium ions is between about 5.4:1 and about 11.3:1.
 - 4. A composition according to claim 3, wherein magnesium ions are derived from magnesium chloride hexahydrate or anhydrous magnesium chloride.
 - 5. A composition according to claim 1 wherein the calcium ions are derived from one or more of the group consisting essentially of calcium chloride dihydrate, calcium hydroxide and calcium carbonate.
 - 6. A composition according to claim 1 wherein the calcium ions are derived from calcium chloride dihydrate.
 - 7. A composition according to claim 1 wherein the calcium ions are derived from calcium hydroxide.
- 20 8. A composition according to claim 1 wherein the calcium ions are derived from calcium carbonate.
 - 9. A composition according to claim 1 wherein the calcium ions are derived from calcium chloride dihydrate, calcium hydroxide and calcium carbonate.
- 10. A composition according to claim 1 including sodium citrate or citric acid as 25 a pH adjuster.

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- 11. A solution of functional additives useful for the preservation of cut apple pieces comprising:
 - a. ascorbic acid having a concentration between about 5.0% and 9% (w/w); and
 - b. calcium ions having a concentration between about 0.4% and 0.68% (w/w);
 - c. water;

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wherein the molar ratio between ascorbic acid and the calcium ions is between about 2.8:1 and 4.0:1.

- 10 12. A solution according to claim 11 wherein the molar ratio between ascorbic acid and calcium ions is between about 2.8:1 and about 3.5:1.
 - 13. A solution according to claim 11 wherein the solution further comprises magnesium ions having a concentration between 0.06% and 0.10 % (w/w).
- 14. A solution according to claim 13 wherein the magnesium ions are derived from magnesium chloride hexahydrate or anhydrous magnesium chloride.
 - 15. A solution according to claim11 wherein the calcium ions are derived from one or more of the group consisting essentially of calcium chloride dihydrate, calcium hydroxide and calcium carbonate.
- 16. A solution according to claim 11 wherein the calcium ions are derived from 20 calcium chloride dihydrate.
 - 17. A solution according to claim 11 wherein the calcium ions are derived from calcium hydroxide.
 - 18. A solution according to claim 11 wherein the calcium ions are derived from calcium carbonate.
- 25 19. A solution according to claim 11 wherein the calcium ions are derived from calcium chloride dihydrate, calcium hydroxide and calcium carbonate.
 - 20. A solution according to claim11 wherein the pH is adjusted with citric acid or sodium citrate.

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- 21. A solution of functional additives useful for the preservation of cut apple pieces comprising water and about 5.6% to 9% (w/w) ascorbic acid, about 0.3% to 1% (w/w) calcium chloride dihydrate, and about 0.06% to 0.5% (w/w) calcium hydroxide dissolved in the water, the solution having a pH of 3.5 to 4.5.
- 5 22. A solution according to claim 21 further including about 0.5% to 1.0% (w/w) calcium carbonate.
 - 23. A solution according to claim 21 including about 0.5% (w/w) magnesium chloride.
- 24. A solution according to claim 21, wherein the pH is adjusted with citric acid or sodium citrate.
 - 25. A method of preserving fresh cut apples comprising:
 - a. washing whole fresh apples in a sanitizing solution;
 - b. coring and cutting the apples into pieces;
- c. immersing the apple pieces in a solution made from the composition according to claim 1 for a period of time sufficient to transfer the functional additives in the composition to the apple pieces;
 - d. removing excess solution from the apple pieces;
 - e. packaging the cut apple pieces into containers; and
- f. quick-chilling the treated cut apple pieces in the sealed containers at temperatures of 0 to 4°C for at least 24 hours.
 - 26. A method of preserving fresh cut apples comprising:
 - a. washing whole fresh apples in a sanitizing solution;
 - b. coring and cutting the apples into pieces;

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- c. immersing the apple pieces in the solution according to claim 11 for a period of time sufficient to transfer the functional additives in the solution to the apple pieces;
- d. removing excess solution from the apple pieces;
- 5 e. packaging the cut apple pieces into containers; and
 - f. quick-chilling the treated cut apple pieces in the sealed containers at temperatures of 0 to 4°C for at least 24 hours.
 - 27. A method according to claim 26 wherein the apple pieces are immersed in the solution for a period of 2 to 3 minutes.
- 28. A method according to claim 26 wherein packaging the apple pieces into containers comprises packaging the apple pieces into plastic containers having gas permeabilities of 100 to 180 cm³ of oxygen per 100 inches² per 24 hours at 25°C at 1 atmosphere and 400 to 1000 cm³ of carbon dioxide per 100 inches² per 24 hours at 25°C at 1 atmosphere.
- 15 29. A method according to claim 26 wherein the apple pieces are packaged into containers with a headspace.
 - 30. A method according to claim 29 wherein packaging the apple pieces into containers comprises providing a volume ratio between 0.2:1 and 2:1 between the headspace and the apple pieces.
- 20 31. A method according to claim 26 wherein packaging the apple pieces into containers comprises packaging the apple pieces into containers filled with air.
 - 32. A method according to claim 26 wherein packaging the apple pieces into containers comprises packaging the apple pieces into containers flushed with gas having a mixture of 15% O² (vol), 5% CO² (vol), and 80% N² (vol).